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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,514	01/22/2004	Susan G. Yan	GP-303570	7251

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EXAMINER	
LEWIS, BEN	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/763,514	YAN ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 15-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 15-18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 1/22/04.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. The Applicant's amendment filed on January 23rd, 2006 was received. Claims 15-17 were amended. Claims 1-14 and 19 were cancelled.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action (issued on October 17th, 2005).

Specification

The objection to the abstract of the disclosure has been removed because the abstract of the disclosure has been amended by the Applicant to state that CCDM stands for catalyst-coated diffusion media.

Claim Rejections - 35 USC § 112

3. The claim rejections under 35 U.S.C. 112, second paragraph, on claims 3 and 11 are withdrawn, because the claims have been cancelled.

Claim Rejections - 35 USC § 102

4. Claims 1, 2, 4, 7-10, and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Yen et al. (US Patent No. 6,444,341).

Yen et al. disclose a method of making a membrane electrode assembly comprising providing a diffusion media layer (carbon paper electrode support), providing a microporous layer (sintered catalyst coat) as part of the diffusion media layer, depositing a catalyst layer on the diffusion media layer, spraying an ionomer layer on the catalyst layer, and positioning the diffusion media layer adjacent the membrane so that the ionomer layer faces the membrane (col. 7, lines 1-26).

Claim Rejections - 35 USC § 103

5. The claim rejections rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Dhar (US Patent No. 5,318,863) on claims 1-14 and 19 are withdrawn because claims 1-14 and 19 have been cancelled.

6. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar (US Patent No. 5,521,020, hereinafter referred to as Dhar ('020)) in view of Yen et al. (US Patent No. 6,444,341).

Dhar ('020) discloses a membrane electrode assembly 5 in a proton exchange membrane electrolyte fuel cell (see abstract and Figure 1(a)). Dhar also discloses that the membrane electrode assembly is manufactured by first depositing a high surface area carbon and a hydrophobic polymer (such as polytetrafluoroethylene which is also known under the trademark name TEFLON) to a substrate and sintering which

inherently results in the formation of the microporous layer (see Figures 1a and 2; col. 2, lines 50-54; col. 3, lines 50-67; col. 5, lines 24-51). The substrate (18, 20) called an electrode can be carbon cloth or carbon paper which also functions as an anode or cathode diffusion media layer (col. 2, lines 53-55 and col. 3, lines 60-65). The cathode and anode catalyst layers (36, 38) are deposited onto the respective electrodes 18 and 20 (col. 4, line 29-32). The catalyst layers are also coated with solid electrolyte deposits (22 and 24) made of perfluorocarbon sulfonic acid which is an ionomer (see col. 4, lines 1-10 and Figure 1a). The electrolyte deposits 22 and 24 are placed evenly along the entire surfaces of the respective electrodes 18 and 20 (col. 4, lines 7-10). A membrane made of perfluorosulfonic acid is positioned between the two electrodes and the membrane electrode assembly is prepared by putting the components shown in Figure 1(a) together and pressing for about 90 seconds at a temperature of about 130 °C and at a pressure of 1000 psig to ensure that the two electrodes, and the electrolyte deposits (which are the anode and cathode ionomer layers) are in good contact with each other and with the membrane (col. 4, lines 35-45). The heating process at 130 °C would anneal the membrane electrode assembly.

As seen in Figure 1(a), the anode catalyst layer is about the same size in area as the anode diffusion media layer and the cathode catalyst layer is about the same size in area as the cathode diffusion media layer.

Dhar does not disclose that the electrolyte deposits (the ionomer layers) on the respective catalyst layers are sprayed onto the catalyst layers.

Yen et al. teach that in manufacturing membrane electrode assemblies for fuel cells, conventional techniques can be used and that the liquid electrolyte polymer formed by dissolving the polymer electrolyte in alcohol can be sprayed on with an air brush onto the catalyst layers which are then respectively bonded to an electrolyte membrane (col. 6, lines 45-47; col. 7, lines 1-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to dissolve the polymer electrolyte in alcohol and spray the liquid form of polymer electrolyte onto the catalyst surfaces in order to ensure an even coat of electrolyte deposit onto the catalyst layer for improved ionic contact of each of the electrodes to respective surfaces of the membrane.

7. Claims 14-16, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar (US Patent No. 5,318,863, hereinafter referred to as Dhar ('863)) in view of Yen et al. (US Patent No. 6,444,341).

Dhar ('863) discloses a membrane electrode assembly (70) in a polymer electrolyte membrane fuel cell comprising an anode side including an anode diffusion media layer (electrode 18), an anode catalyst layer 36, and an anode ionomer layer (electrolyte deposit layer 82), the anode catalyst layer being deposited on the anode diffusion media layer and the anode ionomer layer is deposited on the anode catalyst layer; a cathode side including a cathode diffusion media layer (20), a cathode catalyst layer 38, a cathode ionomer layer (electrolyte deposit layer 84) and the cathode catalyst layer being deposited on the cathode diffusion media layer and the cathode ionomer

layer being deposited on the cathode catalyst layer and a membrane 90 positioned between the anode side and the cathode side wherein the anode ionomer layer and the cathode ionomer layer face the membrane (see Figures 6(a) and 6(b); col. 10, line 64 to col. 11, line 45).

As see in Figure 6(b), the anode catalyst layer is about the same size in area as the anode diffusion media layer and the cathode catalyst layer is about the same size in area as the cathode diffusion media layer. The membrane is made of NAFION which is a perfluorinated membrane (col. 7, lines 12-16).

The ionomer layer (electrolyte deposit) is made from a 5% concentrated solution of NAFION 117 and the solvent is preferably a lower aliphatic alcohol such as ethanol or isopropanol (col. 6, lines 62-68).

Dhar ('863) does not disclose that the electrolyte deposits (the ionomer layers) on the respective catalyst layers are sprayed onto the catalyst layers.

Yen et al. teach that in manufacturing membrane electrode assemblies for fuel cells, conventional techniques can be used and that the liquid electrolyte polymer formed by dissolving the polymer electrolyte in alcohol can be sprayed on with an air brush onto the catalyst layers which are then respectively bonded to an electrolyte membrane (col. 6, lines 45-47; col. 7, lines 1-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to dissolve the polymer electrolyte in alcohol and spray the liquid form of polymer electrolyte onto the catalyst surfaces in order to ensure an even coat of

electrolyte deposit onto the catalyst layer for improved ionic contact of each of the electrodes to respective surfaces of the membrane.

Response to Arguments

8. Applicant's arguments filed on January 23rd, 2006 have been fully considered but they are not persuasive.

Applicant's principle arguments are

(a) Applicant respectfully submits that the prior art of record only teaches fabricating an MEA using a bonding and hot-pressing step prior to operation of the fuel cell. Applicant's independent claim 15 now states that the operation of the fuel cell causes the diffusion media layers to form to the membrane, where the diffusion media layers are not bonded to the membrane prior to operating the fuel cell. Therefore, Applicant submits that the prior art of record does not anticipate or make obvious Applicant's independent claim 15 as now more particularly claimed. It is therefore respectfully requested that the j102 and j103 rejections be withdrawn.

In response to Applicant's arguments, please consider the following comments.

(a) Furthermore, unless applicant shows objective evidence with regard to the advantage of eliminating the hot-press step or the bonding step to increase the lifetime of the MEA and fuel cell stack, applicants comments alone are not persuasive. The arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ben Lewis

Patent Examiner
Art Unit 1745

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER